

ANNALS of CARNEGIE MUSEUM

4400 FORBES AVENUE • PITTSBURGH, PENNSYLVANIA 15213

VOLUME 44

DECEMBER 31, 1973

ARTICLE 11

NEW PTEROMALIDAE OF THE *DIBRACHYS* GROUP (HYMENOPTERA: CHALCIDOIDEA) WITH A KEY TO GENERA

GEORGE E. WALLACE

Curator, Section of Insects and Spiders

The following new Pteromalidae are closely allied to a number of genera which, in the catalogs and taxonomic works treating the family, are usually placed or "keyed out" in close proximity to each other. I have chosen to refer to this assemblage as the *Dibrachys* Group, the largest included genus being *Dibrachys* Förster.

Below the generic level at least, this paper is not intended to be revisionary in scope.¹ Treatment therefore is confined to a diagnosis of the group, descriptions of the new species and genus, presentation of a key to the genera, and a check list of those species whose names at present are in good standing. Biological information and synonymies for the majority of the species have been so well documented (Peck 1951, Burks 1958, Peck 1963, Burks 1967, Graham 1969) in recent years that I see no reason to repeat such material here. The general known distribution, however, is given for each species, and also any host information that is available for newer species.

I am grateful to Dr. B. D. Burks, Systematic Entomology Laboratory, USDA, U. S. National Museum, for the loan of specimens on which the descriptions are based, and for more instances of help and advice than can be enumerated here. To Dr. Oswald Peck, Canada Department of Agriculture, I am indebted for many helpful comments and criticisms. It is fitting also to acknowledge my indebtedness to the recent monumental work of Dr. M. W. R. de V. Graham (1969) which has been a guide to several taxonomic characters that I had not included in this

¹Aside from the inclusion of the North American genus *Systellogaster* Gahan, and the new genus herein described, there is nothing innovative in the arrangement of the genera. As far as I am aware, *Systellogaster* has never previously been included in a generic key. Submitted for publication Sept. 29, 1972.

paper in its early stages. Barbara J. Robertson executed the drawings for figures 1-4.

DIAGNOSIS, *Dibrachys* GROUP

Postmarginal vein short, approximately as long as, or shorter than, the stigmal—never much longer; their combined lengths (measured from their common base) much shorter than the width of the wing, usually about one-half this width. Combined marginal and post-marginal veins usually shorter than the wing width measured from the base of the marginal. Wing-fringe usually absent, at least from apex of postmarginal vein to wing apex. Antennae placed on, or close to, a line connecting the ventral margins of the eyes; face more or less receding below. Eyes bare or nearly so. Mandibles never both distinctly 3-dentate; usually the right clearly 4-dentate, the left 3- or 4-dentate or intermediate by broadening or forking of third tooth. Pronotum never as wide as mesonotum. Posterior tibiae one-spurred. Propodeum without a well-developed nucha, and without a spur-like projection at each side. Pygostylar bristles subequal. Hind margins of gastral terga not incised at middle.

Family Pteromalidae; Subfamily Pteromalinae Genus *Helocasis*, new genus

FEMALE: Head large, wider than thorax by ratio of 10:7, higher than wide by same ratio; vertex broad; temples not receding; occiput excavated, acarinate. Eyes bare, ratio of length (longest diameter) to width 3:2. Antenna (fig. 4): formula 11263; inserted slightly above a line connecting lower margins of eyes; scape sub-cylindrical, extending slightly above the median ocellus; pedicel longer than the two ring-segments combined, longer than the first funicular segment, but shorter than all three combined; funicular segments from 1 to 6 increasing only gradually in width and length, club apex sharp. Face below the antennal insertions bearing a prominent nose-like projection overhanging the clypeus (figs. 1 & 2). Antennal scrobe cavity rather deep basally, but becoming shallower upwardly, disappearing just below the median ocellus. Clypeus extremely reduced, the anterior margin slightly produced medially; sides of the face flanking the clypeus somewhat protuberant; malar sulcus absent; genae slightly excavated. Mandibles robust, each with an arcuate fold medially (fig. 1), the ends of the fold especially prominent, the upper end a conspicuous knob that slightly overlaps the clypeus. Left mandible with three distinct teeth, the outer two acute, the inner broad and slightly concave at apex; (dentition of right mandible not examined). Pronotum striately punctate except for a narrow shiny band along the close-fitting posterior edge; anterior face declivitous, the carina poorly defined. Notaulices incomplete. Scutellum without a cross-furrow. Legs normal. Postmarginal and stigmal veins equal in length, each shorter than one-half the marginal, the latter slightly broadened at base (fig. 3); wing fringe short—on three (of four forewings) the fringe of the anterior apical half is lacking (probably rubbed off). Posterior border of metanotum divided at middle third into two thin carinae separated by a row of punctures, the anterior carina forming a narrow shelf behind the scutellum. Propodeal surface uneven, reticulately punctate, a pit on each side setting off the short broad neck; spiracle reniform, anteriorly contiguous to the metanotum; median and lateral carinae present; the median distinct, sinuate; each lateral carina divaricated posteriorly, the outer branch recurved anteriorly, inclosing a sulcus that almost surrounds the spiracle; width of this sulcus and diameter of spiracle subequal, floor of sulcus finely and delicately punctate. Abdomen rotund, flat, equal to thorax in length.

MALE: Unknown.

TYPE SPECIES: *Helocasis burksi*, n. sp.

Helocasis burksi, new species

Figures 1-4

FEMALE: Length 2.0-2.1 mm. Head and thorax reticulately punctate, punctures finer on the scutellum, widened transversely on the pronotum. Head sparsely furnished with stout hairs—most abundant on the genae, at each side of the nose-like projection, and on the mandibles. Postocellar and ocellocular lines subequal. Median ocellus appreciably larger than the lateral ocelli. Lengths of veins of forewing (submarginal: marginal: postmarginal: stigmal) in ratio of 11:7:3:3. First abdominal tergum approximately as long as one-third of abdomen, the hind margin slightly convex-arcuate; following terga approximately equal to one-third of first.

Color of head and thorax black, the scutellum slightly cupreous; abdomen brown. Antennae brown. All coxae black tinged with castaneous; remaining parts of all legs brown. Wings hyaline.

Described from two specimens.

MALE: Unknown.

HOST: Unknown.

TYPE LOCALITY: Presque Isle, Erie, Pa.

Holotype and paratype in United States National Museum of Natural History Chalcidoidea Collection. The holotype is labeled: ferns behind lab; Presque Isle, Erie, Pa. vii-31-1934 G. E. Wallace. The paratype is labeled: Muncie, Ill. Sept. 10, 1936 Cattail Bog B. D. Burks. The specimen that I collected was taken by sweeping ferns at the end of a wet meadow. Dr. Burks has told me that his specimen was probably taken by sweeping cattails.

Genus *Systellogaster* Gahan***Systellogaster gahani***, new species

FEMALE: Length 2.15-2.30 mm. Antennae essentially as in *S. ovivora*. Vertex, temples, and genae reticulately punctate. Face, lower fifth of frons, mesoscutum (including scapulae) anteriorly, and pronotum finely and densely punctate. Scutellum, axillae, more than posterior half of the mesoscutum, and upper portion of frons glassy smooth. These polished areas, particularly of frons, with minute punctures marking sites of obsolescent or rubbed-off hairs. Propodeum closely punctate, callus slightly flared laterally over coxal insertions. Petiolar emargination deep, nucha evident only as a flange on either side of abdominal petiole. Lengths of submarginal, marginal, postmarginal, and stigmal veins in ratio of 7:5:1:1. Abdomen rotund, first tergum approximately one-fourth length of abdomen, the remaining terga subequal.

Head black, temples with slightly greenish reflections. Pronotum, mesonotum, and scutellum black, the latter two with coppery reflections—the reflections especially evident on the scutellum; pronotum with a greenish cast. Propodeum blue. Dorsoposterior edge of hind coxae bluish-purple; remainder of hind coxae, fore- and mid-coxae, and all femora and tibiae, completely brown; tarsi stramineous. Forewings behind stigmal and marginal veins with a tawny cloud, extending beyond these veins apically and basally, and becoming fainter apically, disappearing at about middle of wing. Abdomen brown.

REMARKS: Set off markedly from *ovivora*, the other species of the genus, by the highly polished impunctate areas of head and thorax.

Described from three specimens.

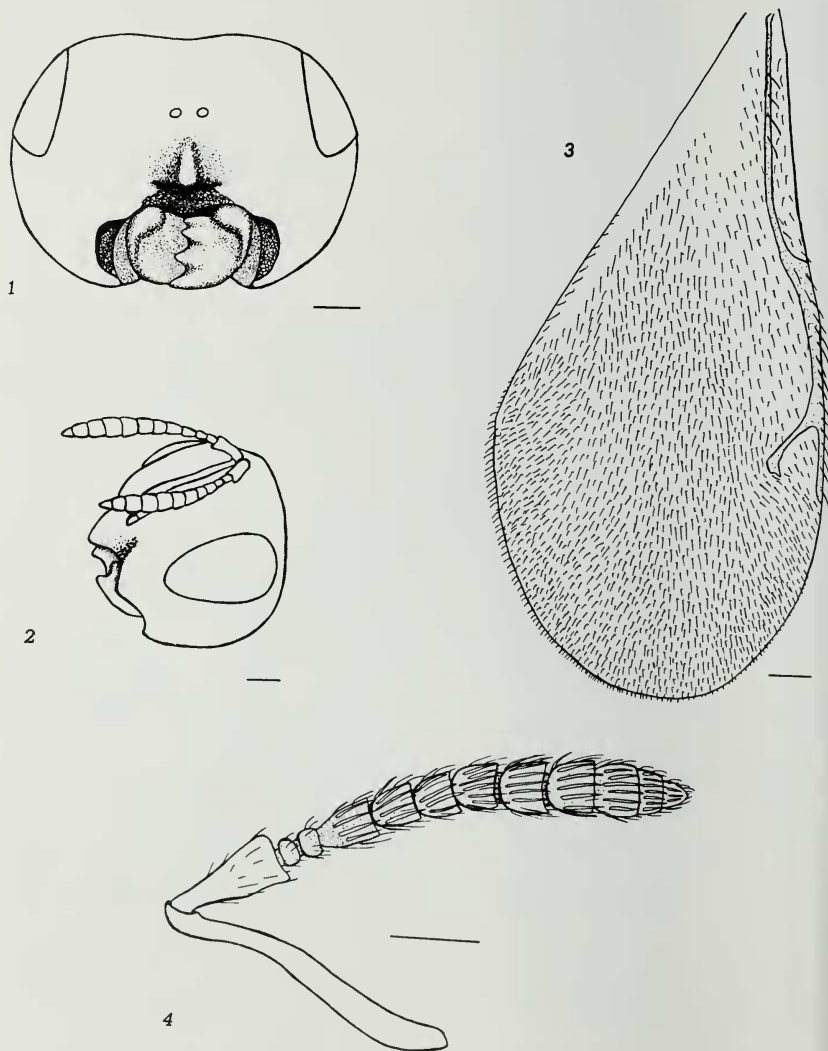
MALE: Unknown.

HOST: Unknown.

Holotype and one paratype in United States National Museum of Natural History Chalcidoidea Collection. The holotype is labeled: W. S. Craig, Coll., Columbia, Mo. 4-14-40.

The paratype bears the same data.

One paratype in Illinois Natural History Survey Chalcidoidea Collection. Labeled: Illinois Natural History Survey Collection #17652,—Urbana, Ill., Oct. 24, 1891, woods, Hart. This paratype and the holotype bear Gahan det. labels to genus, and "n. sp."



Figs. 1-4: *Helocasis burksi*, new species. (All scale lines equivalent to 0.1 mm) Fig. 1. Head, lower front view. Fig. 2. Head, quarter view. Fig. 3. Right forewing. Fig. 4. Antenna.

KEY TO GENERA OF THE *Dibrachys* GROUP

1. Head thin antero-posteriorly. Thorax dorsally flattened *Platneptis* Bouček
 Not at all as above 2
2. Pronotum with an anterior carina; if carina weakly indicated, then a distinctly impressed scutellar crossfurrow present, the funicular segments sometimes transverse. Antenna with one or two ring-segments 3
 Pronotum without an anterior carina. Antenna with two or three ring-segments 6
3. (2). Occiput with a carina; if carina weakly indicated, then funicular joints transverse. Genae rounded 4
 Occiput without a carina; funicular segments not transverse. Genae excavated 5
4. (3). Marginal vein swollen at base. Antenna placed slightly above subocular line; *female* with one ring-segment and seven funicular segments, the latter not transverse; *male* with two ring-segments and six funicular segments; club apex not acutely pointed. Pronotum bearing a row of rather long recumbent brown hairs. Wing fringe frequently absent (sometimes obsolete) from wing apex to end of postmarginal vein *Muscidifurax* Girault
 Marginal vein evenly wide throughout. Lower edge of toruli touching subocular line. Antenna of both female and male with two ring-segments and six funicular segments; funicular segments of female transverse. Intervals between pronotal hairs equal to or more than lengths of individual hairs. Propodeal callus moderately hairy; nucha prominent; lateral carinae, and usually the median carina, present. Wings without fringe; the wings of *male* abbreviated. Antennal club not acutely pointed *Nasonia* Ashmead
5. (3). Head large, thick, much wider than the thorax; vertex usually thick antero-posteriorly, flattened, meeting occiput at an angle; occiput excavated. Propodeal callus-hairs abundant. Wing fringe absent. Abdomen conic-ovate, longer than the thorax. Scutellar cross-furrow indicated only by a line and a slight change of sculpture and color. Eye measured vertically rather long, tapering at lower half *Dibrachoides* Kurdjumov
 Head smaller, the vertex more rounded. Scutellum with a distinctly impressed cross-furrow. Propodeal callus sparsely haired. Abdomen rotund. Wing fringe absent *Schizonotus* Ratzeburg
6. (2). Occiput either with a carina, or the occiput-vertex boundary distinctly angulate 7
 Occiput without a carina; occiput and vertex not meeting at an angle 9
7. (6). Occiput with a carina. Abdomen usually (all North American species) conic-ovate, longer than the thorax. Punctures normal in size—3 to 5 in a .025 x .025 mm square. Wing fringe usually either absent or only scantily present on posterior edge of wing; present only in *Dibrachys daphne* Girault *Dibrachys* Förster
 Occiput without a carina; occiput-vertex boundary angled. Abdomen ovate, shorter than the thorax. Punctures either normal in size or extremely fine 8
8. (7). First funicular segment not subconical, all funicular segments subequal in length; antennae inserted above the lower margin of the eyes. Punctures small, dense—9 or 10 in a .025 x .025 mm square. Lower face densely and

- uniformly punctate, the punctures effacing the clypeal boundary; malar sulcus absent. Rarely the posterior half of mesoscutum, scutellum, and axillae impunctate and highly burnished. Marginal vein long, exceeding the width of wing (as measured across from the base of vein); a little more than three times the length of the postmarginal; postmarginal and stigmal veins short, subequal. Wings infumate. Hair patch on propodeal callus small, but conspicuous *Systellogaster* Gahan
- First funicular segment subconical, about as long as second and third combined. Punctures normal. Scutellum without a cross-furrow. Genae excavated at bases of mandibles. Either postmarginal or stigmal vein more than one-half as long as marginal vein *Conomorium* Masi
9. (6). Abdomen rotund or subrotund. Antennae usually placed slightly below the subocular line; face sometimes receding below antennae. Occiput excavated; vertex long, but not meeting occiput at an angle. Pedicel shorter than first funicular and ring-segments combined 10
- Abdomen not rotund or subrotund. Antennae placed below the subocular line. Face receding below antennae. Occiput-vertex boundary not angulate. Pedicel longer than first funicular and ring-segments combined. Wings clear or infumate *Tritneptis* Girault
10. (9). Marginal vein nearly four times as long as the stigmal. *Male* scape greatly enlarged, deeply incised subapically. (I have seen only males.) *Stichocrepis* Förster
- Not at all as above 11
11. (10). Antennae with two ring-segments, inserted at or well below the subocular line; face strongly receding below antennae. Wings sometimes infumate. Face without a nose-like projection below the antennae. Marginal vein of uniform width throughout *Kranophorus* Graham
- Antenna with three ring-segments, or the face with a nose-like projection below the antennae. Antenna inserted above the subocular line. Club apex rather pointed. Wings clear 12
12. (11). Antenna with three ring-segments. Face without a prominent nose-like projection. Marginal vein of uniform width throughout; postmarginal and stigmal veins subequal in length. Wing fringe indistinct at least on anterior half of apical border 13
- Antenna with two ring-segments. Face with a prominent nose-like projection below the antennal insertions. Basal half of marginal vein somewhat broadened. Wing fringe short, especially along anterior half of apical border where the fringe is probably lacking (rubbed off) on older individuals *Helocasis* Wallace
13. (12). Marginal vein at least twice as long as radius; antenna attached below level of ventral eye margin, where face convex and strongly receding towards mouth. *Pseudomicromelus* Gahan and Fagan
- Marginal vein at most 1.5 times as long as radius; antenna attached at level of lower eye margin, where face not strongly prominent *Cyclogastrella* Bukovskij

Note: Characters of couplet 13, separating *Pseudomicromelus* from *Cyclogastrella*, are from Peck, Bouček, and Hoffer, 1964. The key characters for *Platneptis* and *Conomorium* are from this work, and from Graham, 1969. I have not seen representatives of these last two genera.

CHECKLIST OF GENERA AND SPECIES

- Conomorium* Masi. One species, *C. patulum* (Walker).
Known distribution: Europe.
- Cyclogastrella* Bokovskij. Three species.
- (1) *Cyclogastrella clypealis* Bouček.
Known distribution: Eastern Europe (recorded only from Czechoslovakia and Moldavian SSR).
 - (2) *C. deplanata* (Nees)
Known distribution: North America, Europe, North Africa (recorded only from Morocco).
 - (3) *C. flavius* (Walker)
Known distribution: Northern Europe, including Britain.
- Dibrachoides* Kurdjumov. Two species.
- (1) *Dibrachoides dynastes* (Forster).
Known distribution: North America, Europe, North Africa.
 - (2) *D. cionobius* Graham.
Known distribution: Europe (recorded only from England).
- Dibrachys* Förster. Fourteen (?) species. A key to six species is provided by Bouček (1965), and Graham (1969) gives a key to eight. The subgenera, where given here, are according to these authors.
- (1) *Dibrachys (Allodibrachys) affinis* Masi.
Known distribution: Western Europe including Britain; North Africa (Algeria).
 - (2) *D. (D.) boarmiae* (Walker).
Known distribution: England.
 - (3) *D. (D.) braconidis* (Ferriere and Faure).
Known distribution: Italy (Viggiani 1968: 112-113); France.
 - (4) *D. (D.) cavus* (Walker).
Known distribution: Holarctic. Probably will be found elsewhere.
 - (5) *D. confusus* (Girault).
Known distribution: The holotype was collected at Washington, D.C.; but see remarks under *D. maculipennis* Szelenyi.
 - (6) *D. daphne* Girault.
Known distribution: California.
 - (7) *D. (D.) fuscicornis* (Walker).
Known distribution: Britain.
 - (8) *D. (Allodibrachys) hians* Bouček.
Known distribution: Italy (Viggiani (1968: 113-114); Czechoslovakia, Moldavian SSR).
 - (9) *D. (D.) lignicola* Graham.
Known distribution: England, Ireland.
 - (10) *D. (D.) maculipennis* Szelenyi.
Known distribution: Hungary. Also N. A. (Hobbs, 1968, and Peck, 1969).
(Note: Dr. B. D. Burks believes that this is a synonym of *D. confusus* Girault, *in litt.*).
 - (11) *D. (D.) saltans* (Ratzeburg). Discussed but not keyed by Graham (1969: 809).
Known distribution: Holarctic.
 - (12) *D. (D.) vesparum* (Ratzeburg). Discussed but not keyed by Graham (*loc. cit.*).
Known distribution: Europe.

Of doubtful standing:

- (13) *D. antiqua* (Walker). Only reference seen: Nielsen (1965: 54, 56).
Host: Parasitizes *Rhacodineura antiqua* Mg. (Diptera: Tachinidae), the latter a parasite of the common earwig, *Forficula auricularia* L. "A few cases of hyperparasitism were noted, i.e. pupae of *Rh. antiqua* parasitized by *Dibrachys antiqua* Walker (Pteromalidae)." Identification attributed to Dr. O. Bakkendorf.
Known distribution: Denmark.
- (14) *D. zelleri* (Ratzeburg). Only recent reference seen: Martelli and Arru (1957-58: 30). Identification attributed to Prof. L. Masi. Host: *Malacosoma neustrium* L.
Distribution: Italy (Sardinia).

Helocasis Wallace. One species, *H. burksi* Wallace.

Biology: Unknown.

Known distribution: North America (Pennsylvania and Illinois).

Kranophorus Graham. Seven species, five of which occur in North America, two in Europe. The genus has long been known as *Coelopisthia* (Ashmead and auctt. nec Forster). See Graham: (1956: 257, and 1969: 819).

- (1) *K. bicarinata* (Girault).
Known distribution: The holotype is recorded from "North America."
- (2) *K. extentus* (Walker).
Known distribution: Europe.
- (3) *K. forbesii* (D.T.)
Known distribution: North America.
- (4) *K. fumosipennis* (Gahan).
Known distribution: North America (Maryland).
- (5) *K. intermedia* (Girault).
Known distribution: North America (Washington, D.C.)
- (6) *K. pachycera* (Masi).
Known distribution: Europe.
- (7) *K. suborbicularis* (Provancher).
Known distribution: North America.

Muscidifurax Girault and Saunders. Five species, of which four have been recently described by Kogan and Legner (1970). In this very comprehensive work, a key to the species is provided.

- (1) *M. raptor* Girault and Saunders.
Known distribution: has been considered as practically cosmopolitan, but studies of Palearctic and Indo-Australian populations are probably necessary.
- (2) *M. raptorellus* K. & L.
Known distribution: Chile, Uruguay.
- (3) *M. raptoroides* K. & L.
Known distribution: Costa Rica, Mexico.
- (4) *M. uniraptor* K. & L.
Known distribution: Puerto Rico.
- (5) *M. zaraptor* K. & L.
Known distribution: Western U. S. (California, Utah, Arizona, New Mexico).

Nasonia Ashmead. One species, *Nasonia vitripennis* (Walker).

Known distribution: cosmopolitan.

Platneptis Bouček. One species, *Platneptis laeta* (Walker).

Known distribution: Europe.

Pseudomicromelus Gahan and Fagan. Three species.

- (1) *P. australia* (Girault)

Host: Reared from larvae of *Carpocapsa pomonella*.

Known distribution: Glen Innes, New South Wales.

- (2) *P. cyrene* (Walker).

Known distribution: St. John's Bluff, Fla.

- (3) *P. silanus* (Walker)

Known distribution: Mount Wellington, Tasmania. European occurrence has been cited, but Graham (1969: 797) has stated his belief that the European record of *P. silanus* is probably a mistake for *Cyclogastrella deplanatus* (Nees).

Schizonotus Ratzeburg. Eight (?) species.

- (1) *S. latus* (Walker)

Known distribution: North America, Europe, North Africa?

- (2) *S. rotundiventris* (Girault)

Known distribution: Virginia, New Jersey, (Weiss, 1917, reported the species from Irvington, New Jersey—bred from pupa of *Plagioderia versicolor*). *S. rotundiventris* (Grlt.) may prove to be *S. latus* (Walker).

- (3) *S. sieboldi* Ratzeburg.

Known distribution: Europe.

The following are of doubtful standing. I know of no confirmation of the generic placement of these Australian species. The locality of Wynnum is in the present-day limits of the city of Brisbane.

- (4) *S. amabilis* Girault and Dodd.

Known distribution: Australia (Gordonvale, Cairns, Queensland).

- (5) *S. arboris* Girault.

Known distribution: Australia (Wynnum).

- (6) *S. doddi* Girault.

Known distribution: Australia (Gordonvale, Cairns, Queensland).

- (7) *S. punctatifascies* Girault. (*Schizonotus punctifacies* Boucek, 1958,—misspelling).

Known distribution: Australia (Wynnum).

- (8) *S. punctatiscutum* Girault.

Known distribution: Australia (Wynnum).

Stichocrepis Förster. One species, *S. armata* Förster.

Known distribution: Central and Eastern Europe.

Systellogaster Gahan. Two species.

- (1) *S. ovivora* Gahan.

Known distribution: North America.

- (2) *S. gahani* Wallace

Known distribution: North America (Missouri and Illinois).

Tritneptis Girault. Seven species, possibly all occurring in North America. Keys to various species have been presented to Gahan (1938), Graham (1969), and Burks (1971). Burks' key covers all described species except *lophyrorum*.

- (1) *T. diprionis* Gahan.

Known distribution: North America, Europe.

- (2) *T. doris* Burks, 1971. Host reared from pupae of *Coloradia doris* Barnes, and *Hemileuca* sp. (Lepidoptera: Saturniidae).

- (3) *T. hemerocampae* Girault.

Known distribution: North America.

- (4) *T. klugii* (Ratzeburg).

Known distribution: North America, Europe. (Possibly some records may refer to *lophrorum*.)

- (5) *T. koebeli* Gahan.

Known distribution: Western U. S. (California).

- (6) *T. lophrorum* (Ruschka).

Known distribution: Europe. Graham (1969: 803) states "Sweden, Germany, Czechoslovakia, USSR, Canada, U.S.A."

- (7) *T. scutellata* (Muesebeck).

Known distribution: North America.

REFERENCES CITED

ASHMEAD, W. H.

1904. Classification of the Chalcid Flies or the Superfamily Chalcidoidea, with descriptions of new species in the Carnegie Museum, collected in South America by Herbert H. Smith. Mem. Carnegie Mus. 1(4): i-xi, 225-551, 39 pls.

BOUČEK, Z.

1958. To the taxonomy of the European species of *Schizonotus* and *Caenocrepsis*—parasites of economic importance—with notes and some synonymy in Pteromalidae and Eurytomidae (Hym.). Sb. ent. Odd. nar. Mus. Praha 32: 395-404, 5 figs.

1965. A review of the chalcidoid fauna of the Moldavian SSR, with descriptions of new species (Hymenoptera). Sb. faun. Praci. ent. Odd. nar. Mus. Praha 11: 5-37.

BURKS, B. D.

1971. A new *Trineptis*, with a revised key to the Nearctic species of the genus (Hymenoptera: Pteromalidae). Proc. Biol. Soc. Washington 84(1): pp. 1-6, figs. 1-5.

BURKS, B. D. IN KROMBEIN, K. V.

1958. Hymenoptera of America North of Mexico. Synoptic Catalog. Agr. Monogr. 2, first supplement. 305 pp.

1967. Hymenoptera of America North of Mexico. Synoptic Catalog. Agr. Monogr. 2, second supplement. 584 pp.

GAHAN, A. B.

1938. Notes on some genera and species of Chalcidoidea (Hymenoptera). Proc. Ent. Soc. Washington 40: 209-227.

GIRAULT, A. A.

1915. Australian Hymenoptera Chalcidoidea IX. The family Cleonymidae with descriptions of new genera and species. Mem. Queensland Mus. 4: 203-238.

1916. Descriptions of miscellaneous chalcid-flies. Insector Inscitiae Menstruus, 4: 109-121.

1917. New Australian chalcid-flies. *ibid.*, 5: 133-155.

1922. New chalcid-flies from eastern Australia. *ibid.*, 10: 148-154.

GRAHAM, M. W. R. DE V.

1956. A revision of the Walker types of Pteromalidae (Hym., Chalcidoidea). Part 2 (including descriptions of new genera and species). Ent. Monthly Mag. 92: 246-263, 6 figs.

1969. The Pteromalidae of North-western Europe. Bul. Brit. Mus. (Nat. Hist.) Entomology, Suppl. 16: 980 pp., 686 figs.

HOBBS, G. A.

1968. Controlling insect enemies of the Alfalfa Leaf-cutter Bee, *Megachile rotundata*. Canadian Ent. 100: 781-784.

KOGAN, M. AND E. F. LEGNER

1970. A biosystematic revision of the genus *Muscidifurax* (Hymenoptera: Pteromalidae) with descriptions of four new species. Canadian Ent. 102: 1268-1290, 17 figs., 1 table.

KURDJUMOV, N. V.

1913. Notes on Pteromalidae (Hymenoptera, Chalcidoidea). Russk. Ent. Obozr. 13: 1-24.

MARTELLI, M. AND G. M. ARRU

1957-58. Ricerche preliminari sull'entomofauna della Quercia da sughero ("Quercus suber" L.) in Sardegna. Boll. Zool. agrar. e Bachicolt. serie 2, vol. 1: 5-49.

NIELSEN, B. O.

1965. Parasitterne hos den almindelige ørentvist (*Forficula auricularia* L.). Flora og Fauna 71(2): 37-59, 8 figs., 3 tables.

NIKOL'SKAYA, M. N.

1963. The chalcid fauna of the USSR (Chalcidoidea) [English translation from Russian by A. Birron, and Cole, Z. S.]. Israel Program for Scientific Translations. Jerusalem. (Original appeared in 1952).

PECK, O.

1963. A catalogue of the Nearctic Chalcidoidea (Insecta: Hymenoptera). Canadian Ent. Suppl. 30: 1092 pp.

1969. Chalcidoid (Hymenoptera) parasites of the Alfalfa Leaf-cutter Bee, *Megachile rotundata*, in Canada. Canadian Ent. 101: 418-422.

PECK, O. in MUESEBECK, C. F. W., K. V. KROMBEIN, AND H. K. TOWNES

1951. Hymenoptera of America North of Mexico. Synoptic Catalog. Agr. Monogr. 2: 1420 pp.

PECK, O., Z. BOUCEK, AND A. HOFFER

1964. Keys to the Chalcidoidea of Czechoslovakia (Insecta: Hymenoptera). Mem. Ent. Soc. Canada 34: 120 pp., 289 figs.

VIGGIANI, G.

1968. Ricerche sugli Hymenoptera Chalcidoidea XVI. Su alcuni Pteromalidi nuovi per l'entomofauna italiani, con interessanti reperti biologici relativi a specie del genere *Dibrachys* Foerster. Bol. Soc. Ent. Ital. 98: 112-115, 6 figs.

WEISS, H. B.

1917. Additions to insects of New Jersey, No. 5. Ent. News 28: 214-221.